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ORIGINAL COMMUNICATIONS.

VALEDICTORY ADDRESS TO THE GRADUATING CLASS OF THE TWENTY-SECOND ANNUAL SESSION OF RUSH MEDICAL COLLEGE, JANUARY 25th, 1865.

By Prof. E. S. CARR, M. D.

Gentlemen of the Graduating Class:—

It becomes my duty at this time to offer you the congratulations of your teachers in medicine, upon the successful termination of your pupilage, with a few parting words of advice and earnest well-wishing for your future career.

The word physician in its derivation from the Greek *phucis*, signifies a naturalist, one skilled in the operations of nature; and was only applied among the Greeks to their most eminent philosophers and learned men; such only being consid-

ered worthy to practice the art of healing. Among them was Hippocrates, justly considered the father of medicine, who says that whatever constitutes wisdom is to be found in medicine; meaning that the physician is, and of right ought to be, skilled in all human knowledge. In later times among the Romans the word "Doctor" came into use. The word literally means a teacher, as Gamaliel, a doctor of the law, meaning a teacher of, and one learned in the law. A doctor of physic or medicine, plainly implies one learned in physics or medicine—one who comprehends nature as *a whole*—whose studies and investigations render him so intimate with her laws that he can at pleasure apply his knowledge to the healing of the sick. Cicero tells us that men never resemble the gods so much as when giving life and health to their fellow-men. Such being their character and estimation in early times, we cease to wonder that Esculapius had his temple, and Hippocrates his statue, and that all along the stream of time are memorial statues for those who have fallen in the service of humanity.

It is not my purpose to consume the brief hour allotted to me in eulogizing the profession to which all of you have testified your devotion. You have all, I doubt not, entered it as earnest co-workers with the great and good of all ages, whose ambition has been the alleviation of all human misery, and the advancement of medical science. From each of you the world has a right to expect some golden grain to be added to the treasury of knowledge. Each of you may transmit the inheritance of past ages, brightened and purified in your personal experience and thought.

"Knowledge not realized is not knowledge for us, but knowledge's shadow." I wish to speak to you to-night of the relation which the Physician *should* sustain to the age in which he lives, and the community in which he is placed as the *minister and interpreter of nature*—of the development, present position and attainments, and possibilities of medical science, that you may gain a more adequate appreciation of the demands it makes upon its votaries.

In looking upon science simply as a basis of art, we are apt to depreciate the labors of those who have advanced it solely by their pursuit of abstract truth. And yet it is to these very men, who were observing, comparing, theorizing, two thousand years ago, that modern civilization is most indebted. Commerce to-day pays her grateful tribute to those old-time students of geometry, whose calculations made her path upon the waters.

Out of the dim shadows of antiquity, let us evoke to-night some of those spirits whose remote influences are still felt, who made the epochs in which they lived historical, and bid them tell us what, through the long years of their labor, they learned of the nature and causes of life.

Clad in the flowing garments of Greece, from the ruins of the temple of Cos, the figure of *Hippocrates* first responds to to our call. "More than two thousand years ago," says the sage, "I laid the foundations of medical science; have I not written on imperishable papyrus that the human body is composed of three kinds of substances, solids, fluids and spirits,—did I not teach the multitude of my disciples that all diseases originate from an excess of the four *humours*, blood, phlegm, bile, and black bile? And for the cause of these mysteries, know you not that it is Nature, the superintending Intelligence? To look farther would awaken the displeasure of the gods."———"Yet, I looked," interrupts a nameless Alexandrian shade, "it was I who first took apart the House of Humanity, and in the body of a criminal found what Hippocrates had never dreamed of—the red and white machinery through which Life and Thought silently work—and bade Hierophilos my follower, count the pulsations which indicate their activity."

And now appears upon the stage a confused medley of actors. Dogmatics and Empirics, each claiming to be heralds of a great master.

"*I am Galen*," cries an advancing shade, "I united Dogmatism in reasoning, with Empiricism in practise, and sought

the mystery of life in speculations of the highest order. Do not my books contain opinions which have, for twelve centuries, governed the philosophic world?"

Next appears that great crier, *Theophrastus Bombastus Paracelsus*, whose clamours first convoked men to hear the suggestions of experience. He bears in his hand a crucible, upon which "Eureka" is written in characters of fire; he opens his lecture thus:—

"I possess two sorts of knowledge;
One—vast, shadowy, hints of the
Unbounded aim I once pursued;
The other consists of many secrets, learned
While bent on nobler prize,—perhaps
A few first principles which may conduct to much.
These last I offer to my followers here."

"I shall be glad,
If all my labours, failing of aught else,
Suffice to make an inroad, and procure
A wider range for thought, nay, they do this,
For, whatsoe'er my notions of true knowledge
And a legitimate success may be,
I am not blind to my undoubted rank
When classed with others. I precede my age,
And whoso wills, is very free to mount
My labors as a platform."

"But if my spirit fail,
My once proud spirit forsake me at the last,
Hast Thou done well by me? So do not Thou!
Crush not my mind, dear God, though I be crushed!
Hold me before the frequence of Thy seraphs
And say, 'I crushed him lest he should disturb
My law. Men must not know their strength.
Behold, weak and alone, how near he raised himself.'"

Such was Paracelsus.

As the trees of the forest bend before the mighty wind, so do the spirits cower, as with solemn step and slow, the Interpreter of nature steps upon the scene. "My name and memory I did bequeath to men's charitable speeches, to foreign nations and the next ages," he saith. And again, "I perceive that medicine hath been more labored than advanced; there hath been much iteration, but little progression. Thou, oh Hippocrates, to whom Galen and Paracelsus betake themselves

as to the shadow of an ass, thou wast a worshiper of idols, teaching that the secrets of nature are shut forever with the seal of God." "In thee, oh Galen, I do perceive a man that in his narrowness of mind forsook experience and became a vain pretender. Art thou not he who took away the infamy of ignorance and indolence in Physicians, by declaring so many diseases incurable, and defending thy incapacity by thy despair?"

"And thou, oh fanatical joiner of idols, with thy cohort of chemists beside thee, thou hast made man a pantomine! I can better endure Galen with his humours and elements, than Paracelsus adorning his dreams. Thy elders deserted experience, thou hast betrayed it, and polluted with thy vanity the truth thou mightest have unfolded."

I might continue this ideal representation of the teachers of antiquity a moment farther, bringing in the great cotemporary of Bacon, the immortal *Harvey*, and putting in his mouth the words of a living poet,

> "Life is life which generates,
> *Blood is blood which circulates,*
> And many-sided Life is One."

In so doing, I should only prove to you that the greatest importance of the past to us, is, in assisting us to determine the value of our present possessions.

Gœthe says that Bacon drew a wet sponge across the tablet of human knowledge. To realize the truth of this idea, place yourselves in thought in an early period of the Christian era, when the earth was regarded as reposing in the centre of the Universe, holding in her bosom, Man, the wonderful *Microcosm*, who with all Nature lived and was preserved through the influence of foreign planets, and we shall see how naturally, out of the physical and religious ideas of the time, arose *magic* and *astrology*. What were then considered the highest efforts of the magician tended to *separate* the Divine Element wherever it was found, sullied by opposing elements in visible nature, in order that the Divine and sustaining principle which

lay concealed in every form, might act with freedom. Thus was Alchemy no chance and arbitrary thought, but a necessary element of the prevailing physics.

All physicists, and nearly all physicians searched for the philosopher's stone and the elixir of life, because they *believed* that in the world of gross matter the divine element, when purified, would transmute the same into gold and jewels; applied to the *microcosm* it had power to restore health and prolong life.

Many of the most distinguished alchemists were physicians and among them through the darkness of the middle ages, was hidden the learning and piety of the world. They interrogated nature with a prayer upon their lips; their superstition was the *faith* of the time. And despite the blindness and darkness of the middle ages, there shines out among the alchemists, a grandeur of character, a fixedness of purpose, and a purity of life we should do well to IMITATE.

Of Bacon, as of Plato, it may be said, "When he came, a man who could see two sides of a thing was born." Those pregnant apothegms, "Man is the servant and interpreter of Nature," "the limit of human power and knowledge is in the faculties alone," renovated the fountains of thought. Men heard with joy, such words as these, "God, the Creator of the world, has endowed our souls to contain that world; he has claimed our *faith* for Himself, but the world of *matter* He has submitted to our *senses.*" In the inductive method instituted by this master mind, all things seemed contained, —the profits of experiment, the pleasure of details, the grouping of facts under principles, and those sublime generalizations which we call laws of nature.

Great as are the obligations of the scientist to Bacon, he was not alone. It was for Galileo, and Bruno, and Copernicus to enfranchise the human mind completely from the dominion of superstition,—to widen the universe for the exercise of its powers—to add to the lustre of great discoveries that of the crown of martyrdom.

For it was just at this period that *the Church* began the separation of religion from science, which was unknown in earlier times. *She* felt no security in her home upon an insignificant planet, whirling wildly round its fixed but distant centre; she tested the Copernican theory by the words of the Psalmist: "The sun is as a bridegroom coming out of his chamber, and rejoiceth like a strong man to run a race." Also, "the world is established that it can not be moved;" she tested it by the unaided senses, and found it wanting. Around the funeral pyre of Giordana Bruno, the battle of science and superstition began—nor did it cease after the Reformation had torn off the swaddling clothes in which the human spirit had been wrapped for ages.

In pursuing the evolutions of medicine since the time of Bacon, we observe that, while the objects of the profession have ever remained the same, and a patient search after the cause of life, the mysterious vital principle, continued, physicians abandoned hypotheses and confined themselves more and more to a diligent examination of phenomena. Harvey and Sydenham, and Jenner and Lænnec, produced by their discoveries the most wonderful change in practice. Yet the adoption of the new method was so gradual that even Sydenham considered the "heating of patients in small pox the readiest means of expelling their vicious humors." It is a remarkable fact, says Dr. Revere, that though no class of men have been so devoted to science as the members of our profession, into none of the sciences was the inductive system admitted with such reluctance. It first entered the domain of Anatomy, Physiology, and Surgery; the discovery of the lymphatics, the investigations of Charles Bell into the anatomy and effects of the nervous system being its first fruits. The discovery of Jenner, and the invention of the stethoscope were the results of pure induction. In the general practice of the profession progress has necessarily been much slower from the greater obscurity pervading all living processes, whether healthy or morbid.

Modern medicine dates from the commencement of the 17th century. No man became a convert to the opinions of Harvey till 1695, when Malpighi and Leuwenhock experimented with the microscope, and actually discovered the blood coursing through the arteries. * * * * Rich and varied as are the treasures which the faithful study of Nature have brought to our profession, there are still new continents to be discovereed. When we have exhausted our present domain of inquiries, Nature, like a kind mother, invites us to new fields of conquest.

"Come wander with me, she saith,
Into regions yet untrod;
And read what is there to be read
In the manuscript of God."

Only a small part of the secrets of the human constitution and the laws which govern it, are yet known to us. Life must be considered in its relations to surrounding media, nor can we thoroughly study man as an isolated object. Cuvier, Agassiz, and a host of lesser lights have wrought out the chain of his relationship to beast, bird, fish, mollusk, and moned, until all the successive steps between the highest and lowest forms seem unfolded to our view. And finally we must consider man as a religious, moral and intellectual, as well as physical being. And although the magnitude of these inquiries might almost deter us from entering upon them, all of the sciences are filling our hands with material for the work.

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Medical education, and indeed all education, needs a larger infusion of positive science. Could we borrow time enough from the study of words, from barren metaphysical speculations, to learn what common sense has always dogmatically proclaimed to be of the first importance, the study of Humanity, the men of this generation might almost see the end of Charlatanry and Empiricism. The best interests of our profession demand, in addition to the regular practitioners, a trained class of special observers who may, by a rigid course

of observation and experiment, use all available instrumentalities for the advancement of medical science.

But money must furnish the sinews of education as it does of war. Is it too chimerical to hope that, ere long the "solid men of Chicago" will lay broad and deep the foundations for Hospitals, museums, lecture rooms, and laboratories for instruction and investigation, which shall make the commercial metropolis of the West the medical metropolis of the Union?

Perhaps to some of you gentlemen, my remarks upon the claims and possibilities of our profession seem extravagant. You may say, to what end does the student burn the midnight lamp, consume weary days and nights in the wards of the hospital, inhale the fumes of laboratories, when the laurels he would win by honorable toil, the honors and emoluments of the profession, are bestowed by Esculapius upon his illegitimate children. I answer that this is only a partial truth, and it has this rational explanation. The majority of men, including many of the professedly educated, know so little of the foundations of medical science, that they never rightly estimate the value of the trained and the cultured physician. Were the masses of our people as well instructed in Hygiene as they are in Mathematics, they would cease to be victims of Quackery. They would be better able to realize what an amount of faithful preparation our profession requires, and only to that class of men who are aiding its development by scientific methods, and are governed by its principles in practice, would they entrust their lives.

Your intelligent neighbor knows very well that two and two makes four. He would not think of praying that the rusted corn in his granary be changed to healthy grain; but when the hand of sickness is laid upon his child, unwisely *fed* and *clothed* from its birth, his soul goes out in passionate appeals, and he grasps in his terror the first promise of relief. God forbid that I should speak with disrespect of those upward aspirations of the soul, which in sorrow and in extancy have ascended through all time to the "Father of Spirits,"

but I wish to illustrate the truth, which should be taught in the pulpit and the school, that *God works by laws*,—that it is our business to apply the powers and faculties he has given us to the understanding of these laws, which are but the expression of *His will;* and that this, as well as obedience to them, is a moral duty.

The old Greeks were wiser than we, else had not Homer sung of Machaon, the pupil and son of Esculapias,

> "The spouse of Helen, dealing darts around,
> Had pierced *Machaon* with a deadly wound,
> In his right shoulder a broad shaft appeared
> And trembling Greece for her physician feared,
> To Nestor then Idomeneus began,
> Glory of Greece, old Nelius' valient son,
> Ascend thy chariot, haste with speed away,
> And great *Machaon* to the ships convey.
> A wise physician skilled our wounds to heal
> Is more than armies to the public weal."

Our country provides as yet no path of honor or preferment for those who serve her in camp and field with the weapons which science has forged for the preservation of life. At the call of patriotism, thousands of our noblest medical men left a lucrative professional business for the perils and discomforts of army life; and yet, whatever their services, they are forced to remain satisfied without rank, preferment, or anything but the consciousness of faithful work. Many have laid down their lives in the noblest spirit of sacrifice. They died that their country and its defenders might live. But when they fall, "glory wakes no pains for them." Out of their desolated family circles, and the profession in which they have been honored members, none know their costly sacrifice. The popular eye is caught by the glitter of arms; the popular ear is full of noisy triumphs; but deeper down in the popular *heart* lies a true worship of the heroism of such unrewarded self-devotion, as many an army surgeon's career would furnish for the chronicler of this war. Let the warrior's grave have its laurels; build high the sculptured mar-

ble over the statesman's breast, but lay the *faithful physician* under the daisies and the waiving grass, for the tears of the poor will water them, and his name be held in kind remembrance when brass and marble shall have crumbled into dust.

Gentlemen Graduates :—I have endeavored to present to you a standard of culture which contains all the elements of individual and professional greatness, and to which, I hope, you will aspire. May you each contribute largely to the sum of human knowledge, and aid in keeping up a close and vital union between medicine and general science. Be Doctors of Physic in the original and noble sense of the term, not mere dealers out of powders and pills—not as Luther called the Doctors of his time, "our Lord's cobblers,"—but skilful workmen in the laboratory of life. I need not tell you of the fearful responsibility which your difficult and laborious profession involves. It is not enough when at the bedside of the sick and suffering to say that we have done what we could. *Have we done all that could have been done?* Have we availed ourself of every fact and principle which our profession affords? If not, the pain, the agony, and perhaps the untimely death, stand justly chargeable to our account. Enter then upon your duties with an ardor that time cannot chill and a perseverance that shall overcome all obstacles. You have observed the close relation which exists between the development of the sciences and that of the material, moral and intellectual life of the race, and each of you will stand in the community where you are placed the minister and interpreter of nature. To no class of men does the popular mind turn with more entire confidence than to physicians. There are none who can so easily diffuse an interest in the attainment of scientific truth. Your daily walks and rides will give you opportunities for reading the outside of old earth's mysterious shield; in your reflective hours the mysteries of the inside will reveal itself. If you would not individually retrograde into the rear rank of the professional phalanx, you will be obliged to keep close upon the track of

modern discovery and invention, to be students always. You will find in looking over the illustrious names of those who have done most in advancing medicine, that they were all zealous, busy practitioners of the healing art. Indeed

> "No good, of worth sublime, does heaven permit,
> To light on man as on the passing air,
> The lamp of genius though by Nature lit,
> If not protected, fed and pruned with care,
> Soon dies or runs to waste with fitful glare."
> "Has immortality of name been given
> To them that idly worship hills and groves,
> And burn sweet incense to the queen of heaven?
> Did Newton learn from fancy, as it roves,
> To measure worlds, and follow where each moves?
> Or did Paul gain heaven's glory and its peace,
> By musing o'er the bright and tranquil isle of Greece?"

I may seem to you to have presented science mainly with reference to its lower, material and most obvious uses, but, I firmly believe, beyond these it has rewards for you far more satisfying and permanent. The discoveries of the past are most valuable for their invigorating effect upon the mind of the present, stimulating it to apply the powers of nature to machinery and the mechanic arts, to all the arts of peace and war, they form the groundwork of present civilization; but it is when we realize that *every well conducted examination of a limited object discovers to us a part of the laws which govern the Infinite whole*, that we are led to its higher, more ennobling relations.

The literature of the ancients, embodying their first rude glances at Nature as breathed in the Iliad, will always charm and delight us; but the development of physical science, penetrating beneath the surface of things, showing us the connexion between the laws of nature and the laws of reason, teaching us that the whole creation is but the expression of an All Comprehensive idea, has opened to us a poetry and a literature as much above that of the ancients as knowledge is above ignorance, or truth above error. The true poet is a dreamer no longer.

"Earth outgrows the mythic fancies
Sung beside her in her youth.
And those debonaire romances
Sound but dull beside the truth.
Truth is fair, shall we forego it,
Shall we sigh, right, for a wrong?
God himself is the best poet,
And the real is his song.

Think what a glorious vision was his who first beheld through the telescope, planet after planet, world beyond world, with attendant satellites and moons! What new conception of the hidden glory of minute nature was his who revealed, by the aid of the microscope, a world in every atom! The eye within the eye, beholds the nature within the nature,—sees

"The One Spirit's plastic stress
Sweep through the dull, dense world, compelling there
All new successions to the forms they wear,
Torturing the unwilling dross that checks its flight,
To its own likeness, as each mass may bear,
And bursting in its beauty and its might
From trees and beasts and men into the heaven's light."

In conclusion, Gentlemen, let me assure you that, notwithstanding the vastness of the themes which a contemplation of nature presents, they have no tendency to diminish our interests in the daily affairs of life.

He who shared the counsels of the Father at creation's birth, the *Great Physician*, when among us healed the sick and comforted the afflicted. May you, each and all, imitate his example. See to it that the poor shall never need a friend, or our country in this hour of peril an unconditional supporter. May you lessen the burden of misery and ignorance in the world, and carry with you in all your labors, hearts touched by a *Divine* and universal *Love*.

Thus may you honor the profession which this day welcomes you to its ranks.

CLINICAL LECTURES ON DISEASES OF THE EYE.

By E. L. HOLMES, M. D., of Chicago,
Lecturer on Diseases of the Eye and Ear in Rush Medical College, and Surgeon of the Chicago Charitable Eye and Ear Infirmary.

GLAUCOMA.

Gentlemen:—Glaucoma in its strict sense, as now defined by the results of comparatively recent investigations, is an inflammation of all the internal tissues of the globe, influenced if not caused by a congestion of these tissues, which is always accompanied by an abnormal hardness of the globe and a depression in the papilla of the optic nerve.

The subjective symptoms are usually pain, indistinctness of vision, and the appearance of colored rings around luminous objects. The amaurotic symptoms often commence with a diminution in the extent of the field of vision, and with a marked degree of far-sightedness. These subjective symptoms vary much in severity in different individuals. The pain for instance, may be slight, or it may be agonizing beyond description, especially in acute cases.

By simple inspection the sub-conjunctival vessels are usually found congested, the pupil dilated, although if iritis be present, it may be contracted; the iris discolored and lying nearly if not quite in contact with the cornea; later the aqueous and vitreous humors and lens become cloudy, often giving a peculiar green color to the pupil.

One of the most important objective symptoms, is the abnormal hardness of the globe, best observed by gently pressing the ends of the two fore-fingers alternately upon the closed upper lid. It is difficult to detect this hardness when there is much tenderness or swelling of the lids or conjunctiva. It will be advantageous for you to form the habit of exam-

ining normal eyes, to enable you better to detect different degrees of unnatural hardness or softness of the globe. The cornea becomes less sensitive than normal, as shown by rubbing foreign substances over its surface.

By means of the ophthalmoscope, two very important changes can be observed, before the humors of the eye have become opaque. The papilla of the optic nerve instead of being a plain disk is found to be cupped. The central vessels of the retina, especially the artery, present a peculiar pulsating motion, synchronous with the action of the heart.

Other changes which may be observed in the posterior portion of the eye are not peculiarly characteristic of glaucomatous disease. Before all these symptoms have become marked there are often certain premonitory indications of the approaching disease, such as severe headache, fugitive pains in and about the eyes, temporary congestion of the deeper conjunctival vessels, periodic attacks of dimness of vision, with the appearance of faint-colored rings around a lighted candle. This last symptom, when not dependent upon the presence of mucous on the cornea, should always place the practitioner on his guard in reference to a prognosis.

By recalling to mind a few points in the anatomy and physiology of the choroid and iris, you will readily understand the causes of these symptoms. The inflammation of the choroid, which either covers or encloses the nerves and vessels, supplying the iris and ciliary processes, interferes with the normal action of these vessels and nerves not only directly by the influence of the inflammation in the choroid itself, but also secondarily by the pressure upon them, produced by the increased contents of the globe, from serous exudation. Hence the ciliary muscle is paralyzed, and the patient cannot accommodate the eye for near objects. The ciliary branches of the fifth pair of nerves supplying the cornea, become paralyzed, and the cornea loses its sensibility. The pupil is dilated, since the circular muscular fibers of the iris become paralyzed before the radiating fibres. If the pupil is oval or irregular,

it will be found drawn towards the portion of the choroid, most seriously affected. The serous exudation just mentioned forces the lens and iris forward, sometimes obliterating the anterior chamber. For the same reason the optic nerve is forced more or less through the opening in the sclerotic, giving it the peculiar cupped appearance. The ordinary forces which cause the blood to flow in a continuous stream through the central vessels of the retina, are insufficient to carry the blood through them when pressed upon by the increased quantity of fluids in the eye. The contraction of the heart alone is able to fill the artery, hence the blood passes into the globe with a sudden pulsation.

There is a form of choroidal inflammation which merits your attention, as often causing increase of the intraocular fluids and consequent tenseness of the globe with concavity of the papilla of the optic nerve. This disease also is sometimes termed glaucomatous. It should be remembered, however, that it is an inflammation of the *choroid*, which is liable to extend to the retina and other tissues, while glaucoma is from the very beginning a congestion or inflammation of the choroid, iris and retina together.

This form of simple choroiditis is often caused by injuries, or by a syphilitic or rheumatic diathesis. There seems to be a tendency to the disease in some patients suffering from serious diseases of the heart, lungs, or liver, and in females at the period of final cessation of the menses. True glaucoma may depend in a measure upon these same causes, but there seems to be two other conditions of the eye necessary—a calcarious or atheromatous condition of the vessels of the orbit, of the base of the brain, and even of the globe itself—and a hardened, unyielding condition of the sclerotic. Comparatively recent investigations would lead us to believe that true glaucoma never occurs without a previous change in the vessels as just mentioned. Hence the disease is, like the affection of the vessels, peculiar to patients past middle life; and as the vessels of both orbits are almost invariably affected, so

glaucoma, if it attacks one eye, is almost inevitably to appear sooner or later in the other eye. The condition of the orbital vessels explains why the congestion in the globe should not be confined to the choroid, as in choroiditis.

It is worthy of notice that choroiditis with serous exudation, although it may occur in the aged, is quite common in patients below middle age. It often causes in such patients a dilatation of a portion of the sclerotic (staphyloma scleroticæ) or a general dilatation as in Hydrophthalmia, and yet the papilla may remain almost normal as regards any appearance of depression, as if this last symptom depended in a measure upon an abnormal induration of the tissue of the sclerotic. The disease may be very sudden and acute, with most violent symptoms, or it may be chronic, with symptoms so mild as scarcely to attract the patient's notice for some time. Although the symptoms may occasionally subside without treatment, they are sure to reappear. Loss of vision and atrophy of the globe are the inevitable results of the disease. Medical treatment is absolutely without permanent benefit.

Surgical interference, either in the operation of Iridectomy, as recommended by Græfe, or of section of the ciliary muscle, as proposed by Hancock, is the most reliable means now known for relieving the disease. The application of Iridectomy in the treatment of glaucomatous disease was one of the most brilliant triumphs in operative surgery. Patients suffering the most agonizing pains and totally blind, have been relieved of their pain and restored to sight. If, however, we take the aggregate experience of oculists, throughout the world, we must admit that the operation has not proved of so much benefit in so large a proportion of cases as its friends seemed at first to anticipate. The operation appears to relieve pain in a greater number of cases than it restores vision. The full benefits of the operation are mostly obtained in the earlier periods of the disease, and in acute rather than chronic cases. The operation of Iridectomy in glaucoma is similar in many respects to that for artificial pupil. It is important

that at least one-sixth of the iris be fully separated from its ciliary attachments. To accomplish this is sometimes a matter of difficulty. Two punctures through the cornea near together have been recommended as facilitating this part of the operation. When it is remembered that the iris and lens are often in direct contact with the cornea, the difficulty of performing the operation without injury to the lens will be readily appreciated.

The division of the ciliary muscle is accomplished by passing the point of a cataract knife, the back of the instrument being turned to the centre of the pupil, through the sclerotic about a line from the periphery of the cornea, till an incision has been made two or three lines in length. The edge of the lens should be avoided.

The precise manner in which these operations prove beneficial are not well understood. For different theories and for the discussion relative to the comparative utility of these two operations, I must refer you to the original works of Græfe or their translations, the later foreign journals and hand-books on Diseases of the Eye. Possibly the articles in Braithwaite of the past few years and the monograph of Dr. Keyser, of Philadelphia, would be as useful works for you to read as any you can readily obtain.

Homœopathic Globules.—Two children have been brought up at the Wisbech Police Court, charged with stealing several bottles of homœopathic medicine from the shop of Mr. Finnell. It was said in court that they had eaten the contents of more than 20 bottles without "being either better or worse for it." The children were dismissed with a reprimand. —*London Lancet.*

SELECTED.

ON THE USES OF SUGAR AND LACTIC ACID IN THE ANIMAL ECONOMY.

By SAMUEL JACKSON, M. D.,
Emeritus Professor of the Institutes of Medicine in the University of Pennsylvania.

The chemical history of the sugars has been very thoroughly worked out by the researches of the chemists. As much can not be said for its physiological actions and uses in the animal organism, or its relations with vital phenomena. On these subjects much valuable information has been obtained from the investigations of Liebig, Lehmann, and Cl. Bernard. They have not, however, so completely exhausted the facts as to render further observations unnecessary, or to cause additional suggestions to be thought obtrusive. With this view, it has appeared to me that a short review of this subject would not be inappropriate.

A brief summary of the principal chemical facts will be required in order to obtain clear ideas of the actions and uses of these bodies in animal organisms. There are several varieties of sugar marked by special characters. Chemists divide them into two kinds or species. The first division or species comprises cane sugar, beet sugar, palm sugar (produced and consumed in India), and maple sugar, with some others of less importance. They are named cane sugars, from their possessing similar chemical properties; and because the Chinese or sugar cane was the plant from which sugar was first made in China, anterior to our historical era, and at the present day nearly 90 per cent. of the sugars of commerce is furnished by various sugar canes.

The second kind or species of sugar consists of glucose or fruit sugar, which exists largely in sweet grapes, and in raisins or dried grapes, from which it has received the name of grape sugar. It is not peculiar to the grape, but is present in nearly all sweet-tasting fruit. The sugar of honey is identical

with glucose, which is also the kind of sugar found in the liver, blood, and alimentary canal of animals, and in the muscles, lungs, amniotic and allantoid fluids of the fœtus in its early stages.

The chemical reactions of the two kinds or species of sugar are in strong contrast. The cane sugars are not decomposed by pure potassa and soda; while they are transformed into sugar of the second species, or glucose, by dilute acids and heat. On the contrary, the alkalies potassa and soda decompose glucose, forming peculiar brown-colored acids; according to M. Peligot, the melassic acid. Trommer ascertained that a solution of glucose to which sulphate of potassa and copper were added and heat applied, decomposed the deutoxide of copper of the sulphate by robbing it of one equivalent of oxygen, the protoxide thus formed, being insoluble, is precipitated. This is Trommer's test for diabetic sugar in the urine. Modifications of this test have been made; that of Bareswil is convenient and reliable. It has been adopted by M. Cl. Bernard, who has named it the cupro-potassic test for sugar. M. Becquerel ascertained by experiment that the cane sugars have no actions on the deutoxide of copper, which is not reduced by them.

All the sugars proceed from the transformation of starch. The amylaceous and the saccharine groups of natural bodies are closely allied. They are nearly identical in chemical constitution, consisting of fixed equivalents of carbon (12), with slightly varying equivalents of oxygen and hydrogen in the proportions forming water—that is, from 10 starch, 11 cane sugar, 14 glucose or fruit sugar; or, in other words, they are compounds of a definite proportion of carbon with definite proportions of water. (*Payen.*) Hence their appropriate chemical name carbo-hydrates. From this sameness of composition they are readily transformed into one another. Almost any organic matter in a state of change is capable of effecting this transformation of starch.

In the seeds of the cerealia and of maize an immense store of starch is annually laid up for man and animals. Close in contact with the germ in the seed, imbedded in starch, is placed a small albuminoid substance called diastase. As long as the seeds are kept perfectly dry, even for lengthened periods of time, no action takes place; but as soon as they are exposed to moisture and heat, the diastase exerts a catalytic or fermentative action, and converts the starch into dextrine and glucose. Being very soluble, they immediately become

the organizable substance from which is formed vegetable structure. They are promptly absorbed by the germ, and under its organizing force they are transformed into cellulose, the primary organizable material from which are constructed the primary cells and vessels, and the vegetable tissues and organs.

Mialhe has shown that a similar albuminoid (nitrogenized matter) exists in the mixed saliva. Its catalytic power is so great that one part will transform two thousand of starch into glucose. Some physiologists and chemists (Bernard, Robin and Verdeil) do not admit the existence of diastase as a special organic body. They regard it as an albuminoid or nitrogenized substance, in which a change or molecular action is set up by moisture and heat. Its action, they assert, is the same as that of other animal matter in a state of change or starch. The difference, however, is in time. The action of the mixed saliva is most prompt on prepared starch. When a teaspoonful of hydrated starch is held in a sound mouth with no defective teeth, and well washed, to remove any remains of food from between the teeth, in a few seconds it becomes very fluid (dextrin), in a few more it is sweet, and, if, tested at once, sugar is found in abundance. This difference in time, in the activity of the agent, is in striking contrast with that of common organic matter in a state of change when acting on starch.

MM. Robin and Verdeil, from similar facts deny that pepsin is a special agent in the gastric juice; they regard it as organic matter in process of change, which, with an acidulated fluid, will, they assert, digest articles of animal food. A fluid of that composition will dissolve raw or cooked meat, but requires fifteen or twenty hours to effect it. Nor has it been shown that the special peptone or albuminose, the constant product and object of gastric digestion, resulted from the solution of this artificial digestive fluid. This imperfect observation can not be accepted in the face of the daily experience of healthy digestion accomplished in from three to four hours.

The conversion of starch as an aliment begins in the mouth during mastication, and if in small quantities, is there completed; but when the food is largely amylaceous, the greater portion arrives in the stomach, where the process is continued but not finished. The unchanged starch passing into the intestines, is brought under the action of pancreatin and the intestinal juice, and is rapidly transformed into glucose. When animals are fed exclusively on starch for some days, a portion

is found in the fæces unchanged; the larger part has disappeared in the intestinal canal. (*Lehmann.*)

It has been denied that starch is ever changed into glucose in the stomach, or that it can take place in the presence of an acid. (*Fremy and Boutron.*) This fact has been decided as respects the human stomach, by the experiments of Grunewald and Schroeder, who had under their charge a woman with a gastric fistula produced by a wound. They were communicated to M. Longet by M. Shiff, who witnessed the experiment. "Some ounces of hydrated starch were introduced into the stomach through the fistulous opening while fasting. Immediately after some starch was expelled, which was found already to contain sugar. In a quarter of an hour sugar was found abundantly in the stomach, and the whole of the starch was fluid (dextrin)."*

M. Bidder asserts that the power of changing starch into sugar in the stomach persists in the presence of free acids; and M. Ernst Schroeder states that the saliva possesses its activity in the stomach, and rapidly transformed swelled starch (turgefactum amylum) into sugar.†

This error arose from making the experiment on dogs, in which starch is very imperfectly changed, if at all, by their saliva. Starch does not enter into the natural food of that animal, and it appears as though no provision was made by nature for an office not intended in the natural state. If this view be correct, it is confirmative of the theory that there is a special agent, diastase, in the salivary fluid. Longet expressly objects to the using of these animals in this investigation; he alleges that their saliva has a very low transforming power, and their gastric juice is very acid.

The experiments of Lehmann, Bernard, Longet, Corvisart, and others, have established the facts of the transforming power of the pancreatic and intestinal juices, and that dextrin and glucose are the common products into which all the amylaceous and saccharine substances in food are converted in the alimentary canal. Glucose must, then, be regarded as the *proper physiological sugar.* Bernard has proved its existence in the earliest stages of fœtal development, before the formation of the liver, after which it is chiefly developed in that organ. He detected it in the fluids of the amnios and the allantoid.‡ In seeking for the origin of this sugar, or the

*Longet, Traite de Physiologie, vol ii, p. 174. †Ib., *loc. cit.*

‡ Leçons de Physiologie, vol. i. Leçon, xxi.

glycogenic matter which produced it, he observed in the placentas of rabbits and guinea-pigs a whitish substance formed of a mass of cellules filled with sugar-forming substance. These last resembled in this respect the liver-cells of the adult animal. In pursuing this investigation, M. Bernard ascertained that similar epithelial or glandular cellules existed in the placentas of mammifers in the first periods of embryonic life, producing a sugar-forming substance. This anatomical element of the placenta, in some animals of this class, is mingled with the vascular portion of the organ, but in the ruminants it is separated in the form of epithelial layers on the amnioas. In this manner, as Bernard had previously asserted, the fact is established that the production of an amylaceous sugar-making matter is a function common to animals and vegetables. The provision of transitory structure for producing dextrin and glucose in the earliest stage of the embryon, proves its importance in the nutritive actions and the organizing processes. They appear to be constituent principles of the organizable matter from which organized structures are formed.* In extending his researches, he discovered the same kind of cellules containing sugar-making substance to be diffused in certain tissues in this stage of embryonic development. M. Cl. Bernard gives a full and very clear exposition of the experiments by which he ascertained the above fact. As these are not material in this discussion, I refer those who would wish to see the details to the original memoir, and limit myself to little more than a mere sketch of the results he obtained. 1. The tissue of the skin is infiltrated with the glycogenic matter, which is contained also in the cells of the epithelium, as demonstrated by the microscope. Obtained a decoction of the skin, it manifested its essential character by being changed into sugar by the action of strong acids and under the influence of animal or vegetable diastase. It possessed all the properties belonging to the glycogenic matter of the liver and placenta. It is found also in the corneous appendages of the skin, as hoofs, claws, etc.; it disappears as they become hard and organized. 2. The glycogenic cellules are readily demonstrated in embryons on the whole of the mucous membranes of the alimentary canal, from the mouth and tongue to the end of the large intestines; they are seated in the epithelium which covers the villosities. They also exist in the glandular ducts

* Comptes Rendus de l'Acad. des Sci., vol. xlviii. pp. 77-86.

opening on the mucous membranes. 3. The same cellules are present in the mucous membrane of the bronchial tubes and of the nostrils. These cellules disappear, existing only during a limited period of embryonic existence; notwithstanding, the sugar-making matter remains diffused through the other portions of the pulmonary structure, and remains persistent until birth, as is shown by means of a decoction of the lung, in which it can be detected. 4. In the genito-urinary mucous membranes the same cellules are present during their evolution; they were found in the uterus, Fallopian tubes, bladder, ureters and canaliculæ of the kidneys.

In the above instances the glycogenic cells and substance were observed existing the first stages of development. They are only temporary; and as soon as the permanent epithelia are formed, then they disappear.

5. The muscles in the earliest state of development are preceded by embryonic cells in which no sugar-making substance can be detected by the microscope or by chemical reactions. But at a later period, when the histological elements appear, the glycogenic matter is perceived interposed between the nuclei, and gives its characteristic color on the application of the reagents employed. When the muscular fibre has acquired its development, the glycogenic matter then appears to be infiltrated in the substance of the fibre.

The smooth muscles contain the sugar-making substance, like the striated; it can not, however, easily be detected by the microscope; but when a decoction is prepared from them, then it is found in great abundance, as it is when the striated are treated in the same manner.

The sugar-making substance is persistent in the muscles during the whole period of intra-uterine life, but disappears rapidly after birth.

It is a remarkable fact that the glycogenic matter in the fœtus does not exist in the nervous or osseous systems, or in the glands, appendages to the alimentary canal, as the salivary glands, pancreas, (except in the epithelia of their ducts,) and the glands of Lieberkuhn, the spleen, and lymphatic ganglions.

The liver does not manifest any signs of the presence of saccharine matters until the middle of uterine life. At this time it has acquired its histological structure, and then commence its functions by the formation of bile and the existence in it of glycogenic matter. As the liver enters into functional activity, the glycogenic cellules and matters disappear

from the placenta, its envelopes, and the tissues that have been mentioned. Being a temporary organization and provisional function, at birth they have ceased to exist, and the liver enters on its permanent duties in the animal economy, lasting through life in its normal states.*

The preceding facts worked out by M. Cl. Bernard prove that in the first stage of the organic or nutritive actions, in animals as in vegetables, formative of plastic matter and organic forms, glucose is an indispensable agent. The organic, nutritive, and, as they may truly be named, vital actions, are identical in normal states through all the stages of existence, though, like all the functions, they are liable to be disturbed and perverted by various accidental influences. Yet the same law that presides over them in the embryonic state is persistent to the last span of life. It must be inferred from these facts that glucose is a physiological element in the vital or nutritive actions.

That nature, in milk, the food destined to nourish the young of the great class of mammalia, has made sugar a constituent is a significant fact pointing to the same conclusion. Sugar of milk, in chemical properties, belongs to the first species, or cane sugars, and is convertible into glucose. (*Lehmann.*)

The liver holds a prominent position in the physiological history of sugar. The immediate connection of this organ with the presence of sugar in the animal organism is the great discovery of M. Cl. Bernard. He established as a primary fact that the introduction of saccharine matters into the liver by the portal circulation was incidental and intermittent, while the presence of glycogenic matter was persistent, and sugar was always to be found in the blood of the hepatic veins issuing from the liver. The proportion constantly supplied to the organism in this way was 1 to 1.50. When it exceeds 3 of dried blood, it appears in the urine. These facts have been verified by all the prominent physiologists of Europe. Subsequently, M. Cl. Bernard completed this investigation by proving—first, that the glycogenic substance belonged to the liver; that the sugar may be completely washed out of that organ, removed from the body, and be again reproduced after a few hours; and second, by procuring it in a purified state, entirely isolated from the liver and all animal structure. Obtained in this state, it presented all the physical

*Comptes Rendus de l'Acad. des Sci., vol. lviii, pp. 673-684.

and chemical characters of starch and dextrin.* M. Biot tested it in his polariscope, and found a decided rotatory action to the right. An experiment of M. Pelouze is quite conclusive. He treated one gramme of this purified glycogene with fuming nitric acid, and obtained by the process xyloidine or gun-cotton, similar to that procured from vegetable starch. It was very combustible, and detonated at 180° C. It was converted also into oxalic acid, and by analysis gave a chemical composition that corresponded with the formula $C_{12}H_nO_n$. This glycogenic substance of the liver is transformed in the manner of starch into glucose, by an animal diastase existing in the liver and blood. There are numerous interesting facts connected with the glucogenic function of the liver, but which are omitted as irrelevent to my present object, which is to prove the importance of glucose and lactic acid in the organism as essential agents in organic or nutritive actions.

This view might have been taken from an *a priori* deduction. The immense amount of sugar and starch that enter into the food of man and animals, all of which are converted into glucose in the alimentary canal, are a strong indication of its necessity in sustaining vital activity. Dr. Stolle, some years since, estimated the cane sugars produced and consumed as food at 5,145 millions of pounds per annum.† Since then the cultivation of sugar has been extended, and the sorghum has been introduced into this country and Europe, the syrup of which is largely consumed. To this must be added the great amount of starch that forms so large a portion of vegetable food, together with fruits rich in glucose, as grapes, raisins, dates, figs, bananas, and other tropical productions, and the actual sum of glucose used up yearly in animal organisms will be found little short of double the above estimate. The extent of the cultivation, production, and consumption of the numerous substances for this one object, discloses an instinctive want essential to perfect animal existence, and to supply which nature has made ample provision. Although the exterior resources are so abundant, yet nature, in her foresight, has guarded against the many accidents that, in the eventful lives of man and animals, subject them to the total or partial want of vegetable food, has endowed the liver with its glucogenic function, by which the organism is sup-

* Comptes Rendus, vol. xliv. p. 578.
† Johnson's Chemistry of Common Life, vol. i. p. 224.

plied with glucose. In animals that die of starvation, this office is continued until about the third day before death. Life is protracted, and opportunity given for the intervention of new changes or more favorable events

Having shown the physiological position and importance of glucose in animal organisms, the next step is to follow it in its changes to its termination. A characteristic of glucose is its little stability, less than that of any other member of its group, which adapts it to its special offices in the economy. It disappears from the alimentary canal and the blood, as has been previously stated, while cane sugar, injected into a jugular vein, reappears unchanged in the urine.

In healthy conditions, glucose never accumulates in the blood or is found in any of the secretions, though it is introduced into the circulation without intermission from the liver or the alimentary canal, or both. It must, therefore, either be destroyed or transformed into some other constituent. In certain conditions, not properly ascertained, the reverse takes place, and the blood and whole organism are charged with glucose, and the urine is loaded with it, forming diabetes mellitus. What those conditions are has not been clearly determined. In fatal cases of yellow fever the liver possesses a light ochre color, and, from a limited number of examinations appears overloaded with an amyloid substance, with an entire absence of sugar. A somewhat similar state, but in less degree, it is said, occurs in fatal cases of bilious and intermittent fevers during the paroxysms. It would be an interesting inquiry to examine the liver in this point of view in all malignant forms of fever.

The conversion of cane sugars and amyloid matters of food into glucose is effected in the alimentary canal. In some animals, as dogs, this change does not take place in the stomach as proved by Bernard, but is promptly effected in the duodenum by the pancreatic fluid. In the human subject, hydrated starch is rapidly converted into dextrin and glucose, absorption of which takes place to a certain extent. That absorption of these products occurs, is rendered highly probable by the fact ascertained by Bernard, that cane sugar introduced largely into the stomachs of animals, is detected unchanged in the portal blood. A portion is also changed into lactic acid. This is admitted by both Lehmann and Bernard, who state that lactic acid is often formed in the stomach from glucose by the disturbing action arising from the digestion of the albuminous matter of the food.

Glucose is spread somewhat rapidly throughout the intestinal canal, being found in the cæcum often in an hour after its entrance. It exists as a thin, sometimes clear solution. It disappears in varying times, by two processes—conversion into lactic acid and by absorption. Diversities of opinion prevail on these points, but I follow chiefly Bernard and Lehmann as my authorities. After an abundant meal of saccharine or farinaceous substances the small intestines are decidedly acid; strongest in the duodenum, and feebler in the ileum. Lehmann asserts that this free acid "is lactic acid, according to direct experiments." Butyric acid is often found in the cæcum and colon. The absorption of glucose is rendered apparent from its rapid increase in the blood after a full meal of amylaceous or saccharine food (*Lehmann*).

The diffusive power of glucose is feeble, and its endosmotic equivalent low; hence its absorption is slow, and varies with the strength of its solution. This fact may explain why it is so seldom found in the portal blood, from the difficulty of detecting it in small quantities in that heterogeneous fluid. The whole of the glucose coming from the exterior, the representative of the amylaceous and saccharine food is disposed of in this way by conversion into lactic acid, and absorption into the circulating fluid.

The final destination of the interior supply of glucose, poured in a continuous stream from the heart into the general circulation in normal states of animal existence, can have but one solution. Glucose can not continue to exist under the influence of oxygen, heat and moisture, and in the midst of the unceasing conflicts of chemical atoms in the blood, and is transformed into lactic acid. Thus the final object of the vast provision of amylum and sugars in nature is to procure a constant supply of lactic acid, which thus appears indispensable in supporting vital activity in animal organisms.

This conclusion leads to a second inquiry, as to the uses of the lactic acid. Lehmann, in his *Manual of Chemical Physiology*, says "the physiological importance of lactic acid must not be too lightly esteemed."* It is so constantly present in the animal economy, that it may be looked on as one of its constituents. The subject has not been thoroughly handled. Liebig quotes the question, "What purposes does lactic acid serve in the organism?" and says it is of peculiar importance.† He does not solve it. His conclusion is that it

* Morris' translation, p. 78. † On the Chemistry of Food, p. 101.

is employed to support the respiratory process.* Lehmann and Bernard have gone more fully into the discussion. Their views are from different stand-points, and are, of course, dissimilar, but are not incompatible, and may be each adopted. Lehmann's view is purely chemical and physical, Bernard's is physiological. They are presented in the following brief summary:

1. The acid of the gastric juice has long been an unsettled physiological problem. Lehmann states "it (lactic acid) is the actual cause, with hydrochloric acid, of the digestive power of the gastric juice."† It is certain that no other acids can take their place in an artificial gastric juice. Bernard, from numerous experiments, concludes that lactic is the natural acid of the gastric juice; and Liebig, from Lehmann's own experiments, by correcting an error, decides, "in that case the gastric juice contains lactic acid."‡

2. In the intestinal canal, during digestion of mixed food, albumen and gelatin peptones, the products of the digestion of animal food, become acidulated by the free lactic acid with which they are mixed. According to Graham, acid bodies possess great diffusibility; and Jolly has proved that alkaline bodies have a low diffusive power, but are strongly osmotic. Hence the acidulous digested peptones separated from the alkaline blood in the capillaries of the mucous membrane are rapidly transferred into the circulation by the active endosmose excited in this manner.

3. The lactic acid, by the same physical properties and by the above process by which it promotes the introduction of nutritive materials into the organism, effects the elimination of effete and recremental matters out of the system. This action is most marked in the muscular system, which forms the chief mass of the higher animals. The muscles are strongly imbued with a special fluid (the muscular juice), contained in the interior of the fibrillæ. We are indebted to Liebig for a full knowledge of this fluid. It consists of the effete substances creatin, creatinin, and inosic acid, with alkaline salts held in solution by an acid fluid. Lactic and phosphoric acids, and acid lactates and phosphates, cause its acidity, of which lactic acid is the most important. The elements of active endosmose are here present: an alkaline albuminous fluid in the fine capillaries on one side, and an acidulous fluid in the other, sepa-

* On the Chemistry of Food, p. 103.
† Lehmann's Manual of Chemical Physiology, Morris' translation.
‡ Chemistry of Food, p. 138.

rated by little more than basement membrane must cause a constant flow of the muscular juice into the blood, in which the above effete matters are found to exist, which are rejected by the kidneys, and again met with in the urine, except the inosic acid, decomposed in the circulation. Liebig denies the constant presence of lactic acid or lactates in the urine. He relates an experiment made with "three persons who took a quantity of lactate of potash sufficient to have yielded an ounce of lactate of zinc. Before the experiment the urine had an acid reaction; immediately after it was alkaline, and the potash was detected in it, exceeding in quantity that in ordinary urine. The lactic acid could not be detected in it; it had disappeared in its passage through the blood." Lehmann concludes from* this ready combustibility of its alkaline salts that lactic acid becomes an important assistant in maintaining the animal temperature. This is true, but not more so than any other of the thousands of never-ceasing oxidations going on during life throughout the whole organism, each one contributing its mite, its minimum degree of heat. By this method nature secures the remarkable equilibrium of animal heat indispensable to health and existence.

4. The views of M. Cl. Bernard are almost entirely physiological. He lays down a proposition, or it may be termed a law, which, it appears to me, must be admitted as the expression of an important truth. It is, that whenever vital phenomena are manifested in acts of organization, two circumstances are to be kept in view: the first is the being, form or tissue in a state or process of development; and the next is the organizable matter or medium in and from which the development is taking place. The first will be passed by, as not of moment at this time, and I proceed to the second, in which will be found the examples of the principles it is attempted to establish.

Organic cells or tissues, when in the act of nutrition or development, must call incessantly on the medium of organizable matter that surrounds or bathes them for the materials of their organic composition. Two conditions are required in the organizable matter to adapt it for that purpose: instability of its chemical combinations, and an extreme mobility of the organic molecules, the preordained arrangement of which gives origin to specific cells and tissues. These are the primary and essential phenomena of life, and enable the organic chemical elements to be grouped and disposed of uninterruptedly in

*On the Chemistry of Food. J. Liebig. p. 102.

thousands of modes under germ action. Animal and vegetable cells and tissues can be developed only from a plastic matter in which the organic chemical elements and the organic molecules are prevented from falling into a fixed or statical condition, in which consists the chemical and molecular stability, the characteristic of dead and inorganic matter. Dry gangrene and local embolism may be cited as examples.

This unceasing play of the chemical elements and of molecular activity, so essential to all the vital phenomena of germ development, assimilation, nutrition, secretion, etc., are effected by chemical and physical causes and agents coming from the exterior. Of these the most active and powerful is oxygen; next in power and energy is lactic acid, not glucose. The mere conversion, new arrangement of its chemical atoms, could give no impulse to molecular and chemical disturbance in other bodies, even in contact. But lactic acid, as soon as formed, seizes on the alkalies, converts them into lactates, "which are destroyed as fast as they are produced." (*Liebig.*) In this instance we are presented with the extraordinary phenomenon, persistent through life, of the production of a complex chemical body in the blood, and its almost immediate destruction, apparently without a sufficient object. The lactates have feeble resisting power. Oxygen, at the temperature of the body, and in its active state (ozone), tears asunder the chemical atoms of the acid, forming carbonic acid and water, its oxygen is set loose in a nascent state (highest intensity of chemical force), and the alkalies escape through the kidneys. The blood, by these combined agents, oxygen and lactic acid, is the seat of intense molecular commotion. This state of the organizable matter, it has been shown, is a *sine qua non* of all vital actions. The enigma above stated is solved. The final result of this discussion is that the intention of the immense provision of amylaceous and saccharine substances in the food of animals is the constant production of lactic acid in the blood of animals, to assist in the support of vital motion in the blood. The mode of action of some deadly poisons bears comfirmative evidence in favor of the doctrine. Carbonic oxide, hydrocyanic acid, sulphuretted hydrogen, chloroform appear to exert their fatal effects by arresting the chemical action of oxygen in the blood. Carbonic oxide expels the oxygen of the circulating fluid, though it retains the arterial hue even in the veins. (*Bernard.*) The blood, in poisoning by hydrocyanic acid, is of a dark hue, neither venous nor arterial; it is the same for sulphuretted

hydrogen. Exposed to the air or oxygen, the color is not changed. The same facts attend the poisoning by aconitia and veratria. The blood has been reduced to a quiescent state—to a statical condition, and sudden death is the inevitable consequence. Thejr mode of action on external bodies shows the correctness of our explanation. They prevent fermentation, and arrest it when in progress. Now Pasteur has demonstrated that fermentation is a vital and not a chemical phenomenon, produced by the development and nutritive action of living organisms, vegetable and animal. In alcoholic fermentation sugar is decomposed by the torula cerevisia, which abstracts a part of its carbon and hydrogen for its own nutrition. The remaining constituents enter into new combinations forming vegetable carbonic acid and alcohol. The vitality of the organism is destroyed by the poison, and the fermentation ceases. Modern physicists have demonstrated that light, heat, magnetism, and electricity, the great forces of nature, are varieties of motion. This investigation has led to a similar conclusion, that all purely organic and vital phenomena arise from atomic disturbance and molecular motion.

In the preceding discussion I have adhered to the doctrine of M. Cl. Bernard that the heart injects without intermission into the blood, in normal conditions, a certain quantity of glucose. I am perfectly aware that the fact has been contested by Dr. F. W. Pavey. I have not been convinced by his facts or his argument. He starts with the assumption that all the examinations of the blood, before his own, had been made after death, and that no one had taken the blood from the right heart by catheterism except himself. In this statement he was certainly mistaken. M. Cl. Bernard, in his physiological winter course of 1855, on the 9th of January, in his fifth lecture, made a comparative experiment on two dogs, the one fasting, the other in the act of digestion after a full meal of animal food. The object of the experiment was to show "the physiological oscillations in the distribution and amount of sugar in the blood under the influence of digestion." This was done by taking portions of blood, from the right ventricle, the carotid, and the jugular of each animal. The blood was obtained from the right heart by catheterism—"*en pratiquant une sorte de catheterisme cardiaque*"—which was performed by a simple instrument, of which he gives a figure, and he designed a simple and neat method of operating which he describes. It is omitted for want of space. The results were, that of the samples taken from the first dog (fasting) in

that from the right ventricle alone was sugar detected in small amount; but those from the second dog all yielded sugar, that from the right ventricle quite abundantly, less in that from the carotid, and still less from the jugular.* These conclusive experiments appear to have been unknown to Dr. Pavey.

M. Chaveau, 1856, presented to the Academie des Sciences a series of experiments on the blood of large quadrupeds, as horses, asses, mules, etc. His connection with the Imperial Veterinary School of Lyons gives him great facilities for experimenting with animals. He collected specimens of blood from horses and dogs fasting from twelve hours to six days. The blood was obtained from the coxigeal, femoral, and carotid arteries, and their collateral veins, and from the heart. A quantitative analysis was made with a uniform result; sugar was found in all the different portions of blood, that of the arteries giving the highest figures, and that of the veins the lowest. The blood from the two hearts was nearly the same. But the capital and decided fact was the catheterism of the sub-hepatic veins through the jugular, after the ligation of that vessel, and the auricle into the posterior vena cava; and the blood obtained was the richest in sugar. M. Chaveau remarks that his method was entirely physiological and not open to objection, for in operating on solipedes the animal was always standing (debout†).

I wish to state, in conclusion, that my young friend, Dr. W. F. Atlee, consulting surgeon to the U. S. Satterlee Hospital, two years since treated gangrenous wounds successfully with sugar. This discovery has been confirmed by Dr. J. H. Packard, one of the surgeons to U. S. Hospital, Beverly, N. J.‡ The active agent in this treatment is not the sugar, as is supposed, but lactic acid, into which "sugar of milk, starch, grape sugar, and cane sugar are converted by *contact* with animal substances in a state of decomposition." (*Liebig.*) I would suggest to the gentlemen, surgeons of the U. S. hospitals, in which this formidable affection has frequently prevailed, that they should give a trial of the effects of a direct application of lactic acid. It can be done very readily by using very sour milk. The wound ought to be thoroughly washed with milk, and cleansed of putrid matter, and then covered with pledgets saturated with the acid fluid frequently renewed.

*Leçons de Physiologie Experimentale, vol. i, leçon v, pp. 119–122.
†Comptes Rendus de l'Académie des Sciences, vol. xiii, pp. 1008–12.
‡See January No. of this Journal.

This explanation is supported by the well known fact, that the gastric juice, in which lactic acid is always present, is antiseptic, and arrests putrefaction.—*Am. Jour. of Med. Sci.*

NOTICE OF McPHERSON HOSPITAL.

By Col. T. P. ROBB, State Sanitary Commissioner.

McPherson Hospital occupies the building erected by the city for a city hospital, and used as such previous to the rebellion. It occupies a commanding site, and overlooks much of the ground made historical by the memorable "siege of Vicksburg." It is a commodious structure, but has been much improved since its occupation by us, especially in its interior arrangements. It is, and has been since its establishment, under the charge of Surgeon Powell, of the 72d Illinois Infantry Volunteers. Surgeon Powell has evidently, with a just and commendable pride in his profession and office, devoted all the powers of his cultivated mind to the making it "the Model Hospital," and to my mind he has fully succeeded. It surpasses anything of the kind that I have witnessed in all my experience. It seems to be perfect in all its parts and arrangements. The kitchen, bakery, store-room, and dining hall seem faultless, and would positively be viewed with envious eyes by our best and most fastidious housekeepers of the north, proverbial as that region is for its women of housekeeping propensities. The wards are neatly arranged with an eye single to the comfort of the inmates, and all the rooms are kept in a state of continual cleanliness, that would elicit the admiration of the most zealous devotee of the broom and scrubbing-brush. There is a place for everything and everything in its place. The most perfect order prevails. For the convalescents, (and in such a well ordered house they are numerous,) there is a reading-room, with its large and well selected library, bath-rooms, wash-room, and barber-shop. There is a billiard-room, with a good, though confiscated rebel, billiard table. Though not a judge of such articles, I presume it was "one of Phelan's best." In the yard are swings and other gymnastic apparatus, and a fine bowling-alley just being completed. These improvements have been made, for the most part, without cost to the government, by the aid of convalescent inmates, and

show what can be accomplished by an energetic and intelligent surgeon, whose heart is in his work. No one, after spending an hour in the hospital, will doubt that all these things contribute much to the recovery of the patients. It is to be hoped that more of our surgeons, in charge of hospitals, will in like manner attempt the improvement of the surroundings and interior arrangements. In my opinion the trouble would be amply repaid in the increased comfort, contentedness, and speedy convalescence of the inmates.—*Report to State Sanitary Commission.*

LAST HOURS OF ABRAHAM LINCOLN.

By C. S. TAFT, Acting Ass't Surgeon, U. S. A.

The following brief report of the circumstances attending the assassination, last hours, and autopsy of the late President, will doubtless prove of much interest to the profession, and may be relied upon as correct in all particulars, the notes from which it is written having been submitted to comparison with others taken, and corrected by the highest authority.

While sitting in an orchestra chair at Ford's Theatre, on Friday evening, the 14th ult., about 10.30 P. M., I heard the sharp report of a pistol in the direction of the State box, and turning my head in that direction, saw a wild looking man jump from the box to the stage, heard him shout "*Sic semper tyrannis*," as he brandished a glittering knife in his right hand for an instant, and dart across the stage from sight.

A few moments of utterly indescribable confusion followed, amid which I heard a call for a surgeon. I leaped upon the stage, and was instantly lifted by a dozen pair of hands up to the President's box, a distance of twelve feet from the stage. When I entered the box, the President was lying upon the floor, surrounded by his wailing wife and several gentlemen who had entered from the dress circle. The respiration was inaudible and scarcely perceptible, and he was totally insensible. Ass't Surgeon Charles A. Leale, U. S. V., was in the box, and had caused the coat and vest to be cut off in searching for the wound. The wound in the head was soon found, but at that time there was no oozing from it.

Several gentlemen in the box were insisting upon having the President removed to his home, but Dr. Leale and myself

protested against such a proceeding, and insisted upon his being carried to the nearest house. He was removed to a house opposite, and laid upon a bed in fifteen minutes from the time the shot was fired.

The wound was there examined, the finger being used as a probe, and the ball found to have passed beyond the reach of the finger into the brain. I put a teaspoonful of diluted brandy between the lips, which was swallowed with much difficulty; a half teaspoonful administered ten minutes afterward, was retained in the throat, without any effort being made to swallow it. The respiration now became labored; pulse 44, feeble, eyes entirely closed, the left pupil much contracted, the right widely dilated; total insensibility to light in both.

Surgeon-General Barnes and Robert K. Stone, M. D., the family physician, arrived and took charge of the case. At their suggestion, I administered a few drops of brandy to determine whether it could be swallowed, but as it was not, no further attempt was made. The left upper eyelid was swollen and dark from effused blood; this was observed a few minutes after his removal from the theatre. About thirty minutes after he was placed upon the bed, discoloration from effusion began in the internal canthus of the right eye, which became rapidly discolored and swollen, with great protrusion of the eye.

About 11.30, P. M., twitching of the facial muscles of the left side set in and continued some fifteen or twenty minutes, and the mouth was drawn slightly to the same side. Sinapisms over the entire anterior surface of the body were ordered, together with artificial heat to the extremities.

The wound began to ooze very soon after the patient was placed upon the bed, and continued to discharge blood and brain tissue until 5.30, A. M., when it ceased entirely; the head, in the meantime, being supported in such a position as to facilitate the discharge. The only surgical aid that could be rendered, consisted in maintaining the head in such a position as to facilitate the discharge of the wound, and in keeping the orifice free from coagulum.

Col. Crane, Surgeon, U. S. A., had charge of the head during a great part of the time, being relieved at intervals in this duty by myself. While the wound was discharging freely the respiration was easy; but the moment the discharge was arrested from any cause, it became at once labored.

It was also remarkable to observe the great difference in the character of the pulse whenever the orifice of the wound was freed from coagulum, and discharged freely; thus relieving,

in a measure, the compression. This fact will account for the fluctuations in the pulse, as given in the subjoined notes.

About 2, A. M., an ordinary silver probe was introduced into the wound by the Surgeon-General. It met an obstruction about three inches from the external orifice, which was decided to be the plug of bone driven in from the skull and longed in the track of the ball. The probe passed by this obstruction, but was too short to follow the track the whole length. A long Nelaton probe was then procured and passed into the track of the wound for a distance of two inches beyond the plug of bone, when the ball was distinctly felt; passing beyond this, fragments of the orbital plate of the left orbit were felt. The ball made no mark upon the porcelain tip, and was afterwards found to be of exceedingly hard lead.

Some difference of opinion existed as to the exact position of the ball, but the autopsy confirmed the correctness of the diagnosis upon first exploration. No further attempt was made to explore the wound.

After the cessation of the bleeding from the wound, the respiration was stertorous up to the last breath, which was drawn at twenty-one minutes and fifty-five seconds past seven; the heart did not cease to beat until twenty-two minutes and ten seconds past seven. My hand was upon the heart, and my eye on the watch of the Surgeon General, who was standing by my side, with his finger on the carotid.

The decubitus during the whole time was dorsal, and the position on the bed diagonal; the length of the bedstead not admitting of any other position.

The respiration during the last thirty minutes was characterized by occasional intermissions; no respiration being made for nearly a minute, but by a convulsive effort air would gain admission to the lungs, when regular, though stertorous, respiration would go on for some seconds, to be followed by another period of perfect repose.

At these times the death-like stillness and suspense were thrilling. The Cabinet ministers, and others surrounding the death-bed, watching, with suspended breath, the last feeble inspiration, and as the unbroken quiet would seem to prove that life had fled, turn their eyes to their watches; then as the struggling life within would force another fluttering respiration, heave deep sighs of relief, and fix their eyes once more upon the face of their dying chief.

The wonderful vitality exhibited by the late President, was one of the most interesting and remarkable circumstances

connected with the case. It was the opinion of the surgeons in charge, that most patients would have died in two hours from the reception of such an injury, yet Mr. Lincoln lived from 10.30, P. M., until 7.22, A. M.

The following observations of the pulse and respiration were noted down by Dr. A. F. A. King, at the bed-side, and are correct. The pulse was counted by Acting Ass't Surgeon Ford:

10.55—48. 11.06—45. 11.18—42, and weaker.
11.24—42, respirations 27 per minute, breathing quiet.
11.26— irregular, intermits occasionally.
11.30—45, respiration more frequent and vigorous.
11.32—45, stronger, resp. much more strong and stertorous.
11.39—48, respiration again silent and feeble.
11.40—45. 11.43—45, resp. stertorous.
11.47—45, resp. 24, stertorous. 11.56—48, weaker.
12.10—48, irregularly intermittent. 12.18—48, same.
12.27—54. 12.28—60. 12.29—66, intermittent.
12.38—66. 12.45—69, intermittent. 12.49—84, resp. 28.
12.56—66. 1.00—100. 1.15—92. 1.30—95.
2.10—60, resp. 34. 2.19—58. 2.32—54. 2.37—48.
2.54—48, much weaker, more thready; resp. feeble.
4.18—60, resp. 27, strong and stertorous.
5.40—64, thready, resp. 27.
6.10—60, hardly perceptible, (Barnes,) resp. 26, ster.
6.25— thready, not counted; resp. 25; insp. jerking.
6.40— insp. short and feeble; exp. prolonged and groaning; a deep, softly sonorous, cooing sound at the end of each exp., audible to bystanders.
6.45— resp. uneasy, choking and grunting; lower jaw relaxed; mouth open; a minute without a breath; face getting dark.
6.59— breathes again a little more at intervals; another long pause.
7.00— still breathing at long pauses.
7.20— died.

About 1, P. M., spasmodic contractions of the muscles came on, causing pronation of the forearms; the pectoral muscles seemed to be fixed, the breath was held during the spasm, and a sudden and forcible expiration immediately succeeded it.

At about the same time both pupils became widely dilated, and remained so until death.

During the night Drs. Hall, May, Liebermann, and nearly all the leading men of the profession in the city, tendered their services.

AUTOPSY—FIVE HOURS AFTER DEATH.

Present, Surgeon-General Barnes, Col. Crane, Dr. Stone, Ass't Surg. Woodward, U. S. A., Ass't Surg. Curtis, U. S.A., Ass't Surg. Notson, U. S. A., and Acting Ass't Surg. Taft, U. S. A.

The calvaria was removed, the brain exposed, and sliced down to the track of the ball, which was plainly indicated by a line of coagulated blood, extending from the external wound in the occipital bone, obliquely across from left to right through the brain to the anterior lobe of the cerebrum, immediately behind the right orbit. The surface of the right hemisphere was covered with coagulated blood. After removing the brain from the cranium, the ball dropped from its lodgment in the anterior lobe. A small piece of the ball, evidently cut off in its passage through the occipital bone, was previously taken out of the track of the ball, about four inches from the external wound. The hole made through the occipital bone was as cleanly cut as if done with a punch.

The point of entrance was one inch to the left of the longitudinal sinus. The ball was flattened, convex on both sides, and evidently moulded by hand in a Derringer pistol mould, as indicated by the ridged surface left by the nippers in clipping off the neck.

The orbital plates of both orbits were the seats of comminuted fracture, the fragments being forced inward, and the dura mater covering them remaining uninjured. The double fracture was decided to have been caused by *contre coup*. The plug of bone driven in from the occipital bone, was found in the track of the ball, about three inches from the external wound, proving the correctness of the opinion advanced by the Surgeon-General and Dr. Stone as to its nature, at the exploration of the wound before death.

The ball and fragments, together with the fragments of the orbital plates and plug from the occipital bone, were placed in the possession of Dr. Stone, the family physician, who marked and delivered them, pursuant to instructions, to the Secretary of State, who sealed them up with his private seal. The Nelaton probe used was also marked by me, and sealed up in like manner.—*Med. and Surg. Rep.*

EDITORIAL AND MISCELLANEOUS.

THE NEW MISSION OF THE AMERICAN MEDICAL ASSOCIATION.

The *Medical and Surgical Reporter*, of Philadelphia, a few months since, called attention to the losses of some of the physicians of Chambersburg, Pa., by the rebel "raid" on that place last summer, and proposed that the profession contribute to reimburse the same. In an editorial in the issue of April 15th the subject is again brought forward, amplified, and accompanied with a more explicit proposition to raise a fund for their relief. Nor does the *Reporter* now propose that the Chambersburg sufferers shall be the only recipients of this charity, but that it shall be extended "to all of our profession in the border States or elsewhere, who have been subjected to material losses by the ravages of the war." But we can only do the article justice by quoting from it at length:

"In view of the present aspect of affairs as connected with the rebellion, and the reasonable hope that our national troubles, so far as war and its ravages are concerned, are virtually ended, it is a proper time to propose an extension of the idea embraced in the suggestion in relation to the Chambersburg sufferers, to all of our profession in the border States or elsewhere, who have been subjected to material losses by the ravages of the war. It would be a noble instance of fraternal good will, if the medical profession of the United States were thus to unite in subscribing to a fund to make good to their brethren who have felt the ravages of the war, their office losses. The amount needed would not probably be very large, while the good done would be almost incalculable.

Within the next few weeks, many of our county and some of our State medical societies, and the American Medical Association, will meet. Let this subject be discussed, with a view to taking steps to do something practical and worthy of the medical profession of this great country. The plans might be systematized at the meeting of the American Medical Association, at Boston, in June, at which time a committee might be appointed to make an appeal to the profession of the whole country for funds. A portion of this committee might be named as an executive committee, to distribute the proceeds to those who need it. In this way it ought not to be difficult to raise a fund of fifty to a hundred thousand dollars for this purpose.

The American Medical Association could scarcely give greater evidence of its nationality and usefulness, just at this juncture, than by pursuing the course suggested. Indeed, if it gave up the greater part of its coming session to the work of perfecting a plan for raising and distributing such a fund as is proposed above, it would, in our view, be time well spent, and add greatly to the future influence and usefulness of the Association.

It is desirable to make the medical profession of this country, as far as possible, a unit in feeling, in purpose, and in action. This can best be done by the cultivation of intelligence and kindly feeling through our national medical organization. The war of the rebellion—now apparently, happily, near its close—has interfered somewhat with our intellectual and social progress, but if we are wise enough to avail ourselves of the opportunities offered us of re-establishing good feeling, it will give us the means of securing the intellectual advancement of our profession by securing their good will and co-operation. Many of our medical brethren have been deprived, by the ravages of the war, of their means of intellectual advancement The American Medical Association, by using its influence and its organization so as to aid them in replenishing their libraries and refitting their offices, would only be fulfilling its legitimate functions—in rather an unusual way to be sure, but then the occasion is an unusual one.

We invite correspondence, both on the specific subject of the Chambersburg sufferers, and on the general one of *all* those of our profession who have met with office losses by the ravages of the war, with a view of having something practical done for their benefit. *Let us help our brethren bear their burdens.*"

We certainly can hardly be wrong in supposing that the physicians of Chambersburg were unconscious of this attempt to thrust them as needy objects of commiseration upon the benevolent sensibilities of their professional brethren. "Ye have the poor always with you," is a revealed truth, that is every day attested by observation. We have forgotton who—but most likely it was some able divine—has divided this genus of persons into three species, as follows: the Lord's poor, the devil's poor, and poor devils. Now, if these members of a learned, elevating and honorable calling knew that they were to be thus publicly presented in the attitude of professional paupers, without presenting a protest against it, earnest and manly enough to have stifled such a movement, then have we no doubt among which division of the poor they are included. But we cannot do them the injustice of entertaining such a thought for a moment. The idea that the American Medical Association should lay aside its intellectual character and scientific labors, and "*give up the greater part of its coming session to the work of perfecting a plan for raising and distributing such a fund*," is as ludicrous as can well be conceived. The Knight of La Mancha, in his wildest moments, never indulged a more ridiculous fancy. The rebels, too, we suppose, are to be included in this Catholic scheme, for we are told it is to be a means of "re-establishing good feeling." This would be a fitting sequel to the efforts made at the last meeting of the Association, to furnish the rebels with what they needed more than anything else, namely: medical supplies. Had this sapient plan been carried out, its effect would have been to have returned a larger per centage of the rebels from their hospitals to the ranks, and in a shorter time, and had they accompanied this with a more rigorous starvation of our soldiers, prisoners in their hands, the war might possibly have been protracted another year, and thus offered us a longer opportunity of doing good to our enemies. But, should this project be consummated, and "fifty to one hundred thousand dollars" be obtained, we do

not hesitate, in the name of the profession, to warn the almoners that the Association may appoint to dispense this bounty, not to show themselves in the Northwest in search of their objects of pity. We are poor enough out here, but not so "poor in spirit" as to receive such a proposition without feeling affronted. A people with manliness enough to take *arms* to repel a "raid" upon their soil, would not accept *alms* to cover incidental losses; while if they lack this manliness they do not deserve either sympathy or assistance in their sufferings.

[Interesting extract from a private letter from the Surgeon in charge of the Small Pox Hospital, Natchez, Miss.—Eds.

Mrs. ——, aged 26, was admitted to Hospital January 26, suffering from small pox of confluent form. Nothing remarkable took place until Feb. 3d, when she complained of severe pain in back and abdomen. Anodynes were given, but without benefit. 10 A. M.—She gave birth to a male child of about eight months, which survived four hours. The whole surface of the child was thickly covered at birth with pustules, some fully matured and breaking down and others partially filled. The mother continued to do well until the 7th, 8 P. M., when she was again delivered of a male child, apparently of about four or four and a half months, uterine life. This child was also thickly covered with pustules, but they were not so well filled as the first.

This was certainly a case of super fœtation; the difference in size and development of each child showing plainly that she conceived at different periods. There were two placentas. The woman sank from exhaustion, and expired at 4 A. M. Feb. 9th. The children were not preserved, for want of alcohol.

Query 1*st.*—If a fœtus suffers proportionately with the mother, would not vaccinating the mother afford immunity to the child in after life?

I thought this case might be of interest to the profession, and forward for your favorable consideration what particulars I could learn regarding it previous to my being assigned to duty at this Post. There having been no medical officer stationed here the sick suffered very much and were much neglected.

H. S. HANNEN, M. D.,
Surg. in charge Col'd Ward.

Death of Dr. Valentine Mott.—The profession of medicine is suddenly called to lament the death of one of its most distinguished members, Dr. Valentine Mott. No name is so extensively known or so thoroughly identified with American Surgery as that of Dr. Mott. His long and eminently successful career, not only placed him in the very first rank of Surgeons in this country, but he stood as peer with the most renowned Surgeons of Europe. His reputation had won for him the highest honors accorded to the learned by the Scientific Societies of all countries, while at home he was regarded with veneration and affectionate esteem.

Dr. Mott was born at Glen Cove, Long Island, August 20, 1735, and was at the time of his death in his eightieth year. He was graduated in medicine at Columbia College, in 1806; soon after which he went to England and Scotland, where he continued his studies for several years.

He was long engaged as teacher in the several medical institutions of this city, and held at various times a Professorship in the Medical Department of Columbia College, in Rutgers' Medical College, in the College of Physicians and Surgeons, and in the University of New York.

Dr. Mott has not been a voluminous writer. Besides a number of reports and cases published in medical journals, his principal works were: "Travels in Europe and the East;" "Notes to a Translation of Velpeau's Operative Surgery:" "Anniversary Discourse before the New York Academy of Medicine," and "Clinical Reports."

He died, after a few days illness, ripe in years and full of honors.—*The New York Medical Journal.*

Query 2d.—Can it be possible for a woman to be pregnant, say four months advanced, and conceive again, with an uterus of a single cavity?

Eight hours after death. Post mortem in the above case revealed but one cavity, and nothing remarkable in the appearance of the uterus, excepting the mucous surface was thickly covered with pustules, none of which were well filled with pus.

U. S. A. Gen'l Hosp'l, Little Rock, Ark., Feb. 28, '65.

Editors Chicago Medical Journal:—

Gents:—Although a stranger to you, permit me to forward a very interesting case which came under my care, whilst on duty as Post Surgeon, at the "Mouth of White River," Ark. Private Cyrus Jones, of a colored regiment, was brought to the Hospital, Nov. 3d, 1864, suffering from an attack of "variola confluentia." At that time there was no medical officer assigned to duty at the Post. The patient was treated by the usual remedies, and appeared, as far as I can learn, to do well until about the 14th day after admission, when he complained of severe pain in his left foot. His comrades applied poultices of lins. pulv. and bread, but to no avail. His foot continued to grow worse until about Jan. 26th, at which time I was assigned to duty at that Post.

I found it had sloughed completely off at the tarsus; there was not a particle of hemorrhage, and the stump looked healthy. Patient's right leg at junction of lower with middle third, has also sloughed to such an extent as to expose the tibia for some four or five inches. The patient has recovered from the small pox and his general condition is very good, strange as it may appear. From the condition of his other foot, which was sloughing between the toes, and presents all the appearances of mortification, Dr. Mendenhall, Surgeon of the gunboat Tyler, and myself concluded to amputate it, which was performed at the anterior tuberosity of the tibia. He is now doing well and the stumps both look healthy.

Died.—At Kinston, N. C., April 9th, 1865, Edward E. Lynn, M. D., Ass't Surg. 65th Illinois Infantry.

Died.—In this city, 16th ultimo, David Rutter, M. D., formerly a resident of Philadelphia.

Married.—In Lawrence, Kansas, April 4th, 1865, J. L. Prentiss, M. D., and Miss R. Anderson, both of Lawrence.

BOOK NOTICES AND REVIEWS.

Hand-Book of Skin Diseases. For Students and Practitioners. By THOMAS HILLIER, M. D., London. With Illustrations. Philadelphia. Blanchard & Lea. 1865.

This is an octavo volume of 353 pages, by one who has had extensive opportunities for observation, as Physician to the Skin department of University College Hospital.

During the last few years our knowledge of cutaneous diseases has been considerably extended, and the author of this moderate-sized book has well performed the labor of furnishing to Students and Practitioners a trustworthy, practical and compendious treatise, which comprises the greater part of what has been long known of cutaneous diseases, and what has been more recently brought to light by English, French, and German dermatologists.

A few original wood engravings have been introduced, to illustrate the microscopical appearances of the hair and cuticle when affected by vegetable growth. The use of the microscope is in the present day almost essential for the diagnosis of some skin diseases, and these drawings, in connection with verbal descriptions, will greatly facilitate the diagnosis of the diseases which they are intended to illustrate.

The Anatomy and Physiology of the Skin are briefly ad-

verted to. In treatment the author has avoided complexity, by not unnecessarily multiplying remedies, and by stating the principles on which treatment should be based.

The work will prove useful to the class for whom it was prepared. For sale by W. B. Keen & Co., 148 Lake st.

Alphabetical Index to Braithwaite's Retrospect. Embracing parts 1 to 50—1840 to 1865. Comprising twenty-five years of re-publications.

This is a volume of 248 pages, of great value to those who wish to refer to the past numbers of the *Retrospect*; a work which fully reflects the progress of European Medical Science and Literature.

A Vest Pocket Medical Lexicon. Being a Dictionary of the Words, Terms and Symbols of Medical Science, collated from the best Authorities, with the Addition of New Words not before introduced into a Lexicon, with an Appendix. By D. B. St. John Roosa, M. D., Aural Surgeon to the New York Eye and Ear Infirmary. New York. Wm. Wood & Co., 61 Walker st. 1865.

This little Dictionary is intended to serve as a pocket companion to the student attending Medical Lectures, but by no means as a substitute for the larger works of the same kind. In order to aid in pronunciation the words have been divided into syllables and accentuated. For sale by W. B. Keen & Co., 148 Lake st.

The Pharmaceutists' and Druggists' Practical Receipt Book. With a Glossary of Medical Terms, and copious Index. By Thomas F. Branston. Lindsay, Blakiston & Co., Philadelphia. 1865.

This is a work of 300 pages, and "is offered to the Chemist, Druggist and Medical Practitioner as a useful manual of reference and information." The Glossary is designed "to assist Students of Medicine in reading old receipts and prescriptions, and to understand the contractions and scientific terms used in the medical art."